

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant:	Paul A. Farrar	Examiner:	Unknown
Serial No.:	Unknown	Group Art Unit:	Unknown
Filed:	Herewith	Docket:	303.673US3
Title:	INTEGRATED CIRCUIT AND SEED LAYERS		

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**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicant with the next official communication.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement. However, if an Office Action on the merits has been mailed, the Commissioner is hereby authorized to charge the required fees to Deposit Account No. 19-0743 in order to have this Information Disclosure Statement considered.

Pursuant to 37 C.F.R. §1.98(d), copies of the listed documents are not provided as these references were previously cited by or submitted to the U.S. Patent Office in connection with Applicant's prior U.S. application, Serial No. 10/117041, filed on April 05, 2002, which is relied upon for an earlier filing date under 35 U.S.C. §120.

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The Examiner is invited to contact the Applicant's Representative at the below-listed telephone number if there are any questions regarding this communication.

Respectfully submitted,

**PAUL A. FARRAR**

By his Representatives,

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Date 27 February 2004

By *David R. Cochran*  
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Date of Deposit: February 27, 2004

This paper or fee is being deposited on the date indicated above with the United States Postal Service pursuant to 37 CFR 1.10, and is addressed to The Commissioner for Patents, Mail Stop Patent Application, P.O. Box 1450, Alexandria, VA 22313-1450.

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		<b>Complete if Known</b> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><b>Application Number</b></td> <td colspan="4">Unknown</td> </tr> <tr> <td><b>Filing Date</b></td> <td colspan="4">Even Date Herewith</td> </tr> <tr> <td><b>First Named Inventor</b></td> <td colspan="4">Farrar, Paul</td> </tr> <tr> <td><b>Group Art Unit</b></td> <td colspan="4">Unknown</td> </tr> <tr> <td><b>Examiner Name</b></td> <td colspan="4">Unknown</td> </tr> </table>					<b>Application Number</b>	Unknown				<b>Filing Date</b>	Even Date Herewith				<b>First Named Inventor</b>	Farrar, Paul				<b>Group Art Unit</b>	Unknown				<b>Examiner Name</b>	Unknown			
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<b>Examiner Name</b>	Unknown																														
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### US PATENT DOCUMENTS

Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	Filing Date If Appropriate
	US-01/0002333	05/31/2001	Huang, Chao-Yuan , et al.	438	637	03/29/1999
	US-2002/0014646	02/07/2002	Tsu, , et al.	257	296	
	US-2002/0028552	03/07/2002	Lee, , et al.	438	243	
	US-2002/0096768	07/25/2002	Joshi, Rajiv Vasant	257	750	
	US-2002/0109233	08/15/2002	Farrar, Paul A.	257	762	
	US-2,842,438	07/08/1958	Saarivirta, M. J., et al.	75	153	08/02/1956
	US-3,954,570	06/04/1976	Shirk, Albert , et al.	204	15	11/11/1974
	US-4,386,116	05/31/1983	Nair, Krishna K., et al.	427	99	12/24/1981
	US-4,394,223	07/19/1983	Hall, Dean	204	15	10/06/1981
	US-4,423,547	01/03/1984	Farrar, P. A., et al.	29	571	06/01/1981
	US-4,565,157	01/21/1986	Brors, D. L., et al.	118	719	03/29/1983
	US-4,574,095	03/04/1986	Baum, Thomas H., et al.	427	53.1	11/19/1984
	US-4,762,728	08/09/1988	Keyser, T. , et al.	427	38	11/26/1985
	US-4,788,082	11/29/1988	Schmitt, Jerome J.	427	248.1	12/12/1985
	US-4,847,111	07/11/1989	Chow, Yu C., et al.	427	38	06/30/1988
	US-4,931,410	06/05/1990	Tokunaga, Takafumi , et al.	437	189	08/25/1988
	US-4,948,459	08/14/1990	Van Laarhoven, , et al.	156	643	01/04/1989
	US-4,962,058	10/09/1990	Cronin, John E., et al.	437	187	04/14/1989
	US-4,996,584	02/26/1991	Young, P. L., et al.	357	71	10/13/1988
	US-5,019,531	05/28/1991	Awaya, N. , et al.	437	180	05/19/1989
	US-5,034,799	07/23/1991	Tomita, K. , et al.	357	71	02/14/1990
	US-5,084,412	01/28/1992	Nakasaki, Yasushi	437	189	10/01/1990
	US-5,100,499	03/31/1992	Douglas, M. A.	156	635	06/25/1991
	US-5,130,274	07/14/1992	Harper, J. M., et al.	437	195	04/05/1991
	US-5,158,986	10/27/1992	Cha, S. W., et al.	521	82	04/05/1991
	US-5,173,442	12/22/1992	Carey, D. H.	437	173	03/24/1992
	US-5,231,056	07/27/1993	Sandhu, G. S.	437	200	01/15/1992
	US-5,240,878	08/31/1993	Fitzsimmons, J. , et al.	437	187	04/26/1991
	US-5,243,222	09/07/1993	Harper, J. M., et al.	257	774	01/08/1992

EXAMINER

DATE CONSIDERED

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		<b>Complete if Known</b>				
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		<b>Examiner Name</b>	Unknown			
Sheet 2 of 10		<b>Attorney Docket No: 303.673US3</b>				

	US-5,256,205	10/26/1993	Schmitt III, Jerome J., et al.	118	723	01/07/1992
	US-5,334,356	08/02/1994	Baldwin, D. F., et al.	422	133	08/24/1992
	US-5,354,712	10/11/1994	Ho, Y. Q., et al.	437	195	11/12/1992
	US-5,371,042	12/06/1994	Ong, E.	437	194	06/16/1992
	US-5,384,284	01/24/1995	Doan, T T., et al.	437	190	10/01/1993
	US-5,413,687	05/09/1995	Barton, C. L., et al.	204	192.14	11/27/1991
	US-5,426,330	06/20/1995	Joshi, R. V., et al.	257	752	09/21/1993
	US-5,442,237	08/15/1995	Hughes, Henry G., et al.	257	759	02/04/1994
	US-5,447,887	09/05/1995	Filipiak, Stanley , et al.	437	200	04/01/1994
	US-5,470,789	11/28/1995	Misawa, N.	437	190	03/07/1995
	US-5,470,801	11/28/1995	Kapoor, Ashok K., et al.	437	238	06/28/1993
	US-5,506,449	04/09/1996	Nakano, Tadashi , et al.	257	758	03/23/1994
	US-5,538,922	07/23/1996	Cooper, K J., et al.	437	195	01/25/1995
	US-5,539,060	07/23/1996	Tsunogae, Y. , et al.	525	338	10/13/1995
	US-5,595,937	01/21/1997	Mikagi, K.	437	192	04/12/1996
	US-5,609,721	03/11/1997	Tsukune, A , et al.	156	646.1	01/03/1995
	US-5,635,253	06/03/1997	Canaperi, Donald F., et al.	427	437	06/07/1995
	US-5,654,245	08/05/1997	Allen, Gregory L.	438	629	03/23/1993
	US-5,670,420	09/23/1997	Choi, Kyeong K.	437	189	11/08/1995
	US-5,674,787	10/07/1997	Zhao, Bin , et al.	437	230	01/16/1996
	US-5,679,608	10/21/1997	Cheung, Robin W., et al.	437	195	06/05/1995
	US-5,681,441	10/28/1997	Svendsen, Leo G., et al.	205	114	12/22/1992
	US-5,695,810	12/09/1997	Dubin, Valery M., et al.	427	96	11/20/1996
	US-5,719,089	02/17/1998	Cherng, Meng-Jaw , et al.	438	637	06/21/1996
	US-5,719,410	02/17/1998	Suehiro, S. , et al.	257	77	12/16/1996
	US-5,739,579	04/14/1998	Chiang, Chien , et al.	257	635	09/10/1996
	US-5,763,953	06/09/1998	Iijima, T. , et al.	257	762	01/18/1996
	US-5,780,358	07/14/1998	Zhou, M. S.	438	645	04/08/1996
	US-5,785,570	07/28/1998	Bruni, M. D.	445	52	07/25/1995
	US-5,792,522	08/11/1998	Jin, S. , et al.	427	575	09/18/1996
	US-5,801,098	09/01/1998	Fiordalice, R. , et al.	438	653	09/03/1996
	US-5,814,557	09/29/1998	Venkatraman, Ramnath , et al.	438	622	05/20/1996
	US-5,821,168	10/13/1998	Jain, Ajay	438	692	07/16/1997

EXAMINER

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<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		<i>Complete if Known</i>	
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		<b>Group Art Unit</b>	Unknown
		<b>Examiner Name</b>	Unknown
Sheet 3 of 10		Attorney Docket No: 303.673US3	

	US-5,824,599	10/20/1998	Schacham-Diamond, Yosef , et al.	438	678	01/16/1996
	US-5,858,877	01/12/1999	Dennison, C. H., et al.	438	700	01/21/1997
	US-5,891,797	04/06/1999	Farrar, P. A.	438	619	10/20/1997
	US-5,891,804	04/06/1999	Havemann, R. H., et al.	438	674	04/14/1997
	US-5,895,740	04/20/1999	Chien, Rong-Wu , et al.	430	313	11/13/1996
	US-5,897,370	04/27/1999	Joshi, R. V., et al.	438	632	10/28/1996
	US-5,907,772	05/25/1999	Iwasaki, Haruo	438	253	02/26/1997
	US-5,911,113	06/08/1999	Yao, G. , et al.	438	649	03/18/1997
	US-5,925,930	07/20/1999	Farnworth, Warren M., et al.	257	737	05/21/1996
	US-5,930,669	07/27/1999	Uzoh, Cyprian	438	627	04/03/1997
	US-5,932,928	08/03/1999	Clampitt, D. A.	257	758	07/03/1997
	US-5,940,733	08/17/1999	Beinglass, Israel , et al.	438	655	07/29/1997
	US-5,948,467	09/07/1999	Nguyen, T. , et al.	427	99	07/24/1998
	US-5,962,923	10/05/1999	Xu, Z. , et al.	257	774	08/07/1995
	US-5,972,179	10/26/1999	Chittipeddi, , et al.	204	192.17	09/30/1997
	US-5,972,804	10/26/1999	Tobin, Philip J., et al.	438	786	11/03/1997
	US-5,976,710	11/02/1999	Sachdev, K. G., et al.	428	620	04/10/1997
	US-5,981,350	11/09/1999	Geusic, Joseph E., et al.	438	386	05/29/1998
	US-5,985,759	11/16/1999	Kim, E. , et al.	438	653	02/24/1998
	US-5,989,623	11/23/1999	Chen, Liang-Yuh , et al.	427	97	08/19/1997
	US-5,994,777	11/30/1999	Farrar, P. A.	257	758	08/26/1998
	US-6,008,117	12/28/1999	Hong, Qi-Zhong , et al.	438	629	03/19/1997
	US-6,015,465	01/18/2000	Kholodenko, A. , et al.	118	719	04/08/1998
	US-6,017,820	01/25/2000	Ting, C. H., et al.	438	689	07/17/1998
	US-6,030,877	02/29/2000	Lee, C , et al.	438	381	10/06/1997
	US-6,065,424	05/23/2000	Shacham-Diamond, Y. , et al.	118	696	12/18/1996
	US-6,069,068	05/30/2000	Rathore, H. S., et al.	438	628	10/08/1997
	US-6,071,810	06/06/2000	Wada, Junichi , et al.	438	635	12/23/1997
	US-6,100,193	08/08/2000	Suehiro, S. , et al.	438	685	09/24/1997
	US-6,126,989	10/03/2000	Robinson, Karl , et al.	427	97	08/26/1998
	US-6,136,095	10/24/2000	Xu, Z. , et al.	118	719	10/06/1997
	US-6,139,699	10/31/2000	Chiang, T. , et al.	204	192.15	05/27/1997
	US-6,140,228	10/31/2000	Shan, E. , et al.	438	653	11/13/1997

EXAMINER

DATE CONSIDERED

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Sheet 4 of 10		Attorney Docket No: 303.673US3	

US-6,140,234	10/31/2000	Uzoh, Cyprian , et al.	438	678	01/20/1998
US-6,143,646	11/07/2000	Wetzel, J. T.	438	637	06/03/1997
US-6,150,261	11/21/2000	Hsu, C. , et al.	438	640	05/25/1999
US-6,153,507	11/28/2000	Mikagi, K.	438	618	01/13/1998
US-6,159,769	12/12/2000	Farnworth, Warren M., et al.	438	108	01/05/1999
US-6,171,661	01/09/2001	Zheng, B. , et al.	427	535	02/25/1998
US-6,177,350	01/23/2001	Sundarajan, A. , et al.	438	688	04/14/1998
US-6,183,564	02/06/2001	Reynolds, G. J., et al.	118	719	11/12/1998
US-6,187,656	02/01/2001	Lu, , et al.	438	592	
US-6,190,732	02/20/2001	Omstead, , et al.	118	729	
US-6,197,688	03/06/2001	Simpson, Cindy R.	438	678	02/12/1998
US-6,207,222	03/27/2001	Chen, Liang-Yuh , et al.	427	97	08/24/1999
US-6,207,553	05/27/2001	Buynoski, M. , et al.	438	622	01/26/1999
US-6,207,558	03/27/2001	Singhvi, Shri , et al.	438	648	10/01/1999
US-6,211,049	04/03/2001	Farrar, Paul A.	438	597	02/24/1999
US-6,211,073	04/03/2001	Ahn, K. Y.	438	653	02/27/1998
US-6,221,763	04/24/2001	Gilton, Terry L.	438	643	04/05/1999
US-6,232,219	05/15/2001	Blalock, , et al.	438	637	05/20/1998
US-6,249,056	06/19/2001	Kwon, Dong-chul , et al.	257	758	11/01/1999
US-6,265,311	07/24/2001	Hautala, J. J., et al.	438	680	04/27/1999
US-6,271,592	08/07/2001	Kim, E. , et al.	257	751	08/06/1999
US-6,284,656	09/04/2001	Farrar, Paul A.	438	687	08/04/1998
US-6,287,954	09/11/2001	Ashley, L , et al.	438	622	12/09/1999
US-6,323,553	11/01/2001	Hsu, , et al.	257	751	11/01/2001
US-6,326,303	12/04/2001	Robinson, Karl , et al.	438	678	02/11/2000
US-6,359,328	03/01/2002	Dubin,	257	622	
US-6,372,622	04/16/2002	Tan, , et al.	438	612	10/26/1999
US-6,376,370	04/23/2002	Farrar, Paul A.	438	678	
US-6,387,542	05/14/2002	Kozlov, Alexander , et al.	428	673	07/06/2000
US-6,399,489	06/04/2002	M'Saad, H. , et al.	438	680	11/01/1999
US-6,403,481	06/11/2002	Matsuda, T. , et al.	438	687	08/10/1999
US-6,420,262	07/16/2002	Farrar, Paul A.	438	652	01/18/2000
US-6,426,289	07/30/2002	Farrar, P A.			
US-6,429,120	08/06/2002	Ahn, Kie Y., et al.	438	635	01/18/2000

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Sheet 5 of 10		Attorney Docket No: 303.673US3	

**FOREIGN PATENT DOCUMENTS**

Examiner Initials*	Foreign Document No	Publication Date	Name of Patentee or Applicant of cited Document	Class	Subclass	T <sup>2</sup>
	JP-05160826	03/20/1995	Miyamoto, Ikuo	H01L	21/320 5	
	JP-05267643	10/15/1993	Muraoka, Toru	029	46	
	JP-07-321111	08/12/1995	Tetsuo, K.	H01L	21/320 5	
	JP-07078815	03/20/1995	Miyamoto, I.	HO1 L	21/320 5	

**OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS**

Examiner Initials*	Cite No <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		"Brooks Model 5964 High Performance Metal Seal Mass Flow Controller (Introduced in 1991)", <u>Brooks Instrument</u> , <a href="http://www.frc.com/brooks/semiconductor/products1i.html">http://www.frc.com/brooks/semiconductor/products1i.html</a> , (1991), 1 page	
		ABE, K. , et al., "Sub-half Micron Copper Interconnects Using Reflow of Sputtered Copper Films", <u>VLSI Multilevel Interconnection Conference</u> , (June 25-27, 1995), 308-311	
		AMERICAN SOCIETY FOR METALS, "Properties and Selection: Nonferrous Alloys and Pure Metals", <u>Metals Handbook</u> , 9th ed., vol. 2, Metals Park, Ohio, (1979), Table of Contents	
		ANDRICACOS, P. C., "Copper On-Chip Interconnections", <u>The Electrochemical Society Interface</u> , (1999), 32-37	
		ANONYMOUS, "Formation of Conductors at Variable Depths -- Using Differential Photomask, Projecting Images into Insulator by Reactive Ion Etching, Selectively Filling Images with Conductor", <u>Research Disclosure</u> , Disclosure No. RD 291015, Abstract, (July 10, 1988), 1 page	
		ANONYMOUS, "Improved Metallurgy for Wiring Very Large Scale Integrated Circuits", <u>International Technology Disclosures</u> , 4, Abstract, (1986), 1 page	
		BAE, SANGHOON , et al., "Low-Temperature Deposition Pathways to Silicon Nitride, Amorphous Silicon, Polycrystalline Silicon, and n type Amorphous Silicon Films Using a High Density Plasma System", <u>IEEE Conference Records--- Abstracts</u> , <u>International Conference on Plasma Science</u> , (1997), 315	
		BAI, G. , "Copper Interconnection Deposition Techniques and Integration", <u>1996 Symposium on VLSI Technology</u> , Digest of Technical Papers, (1996), 48-49	
		BERNIER, M. , et al., "Laser processing of palladium for selective electroless copper plating", <u>SPIE</u> , 2045, (1994), 330-337	
		BHANSALI, S. , et al., "A novel technique for fabrication of metallic structures on polyimide by selective electroless copper plating using ion implantation", <u>Thin Solid Films</u> , 270, No. 1/02, (1995), 489-492	

**EXAMINER****DATE CONSIDERED**

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		<b>Group Art Unit</b>	Unknown
		<b>Examiner Name</b>	Unknown
Sheet 6 of 10		Attorney Docket No: 303.673US3	

		BHANSALI, S. , et al., "Selective electroless copper plating on silicon seeded by copper ion implantation", <u>Thin Solid Films</u> , 253, (1994),391-394	
		BRAUD, F. , "Ultra Thin Diffusion Barriers for Cu Interconnections at The Gigabit Generation and Beyond", <u>VMIC Conference Proceedings</u> , (1996),174-179	
		CABRERA, A. L., et al., "Oxidation protection for a variety of transition metals and copper via surface silicides formed with silane containing atmospheres", <u>Journal of Materials Research</u> , 6(1), (1991),71-79	
		CRAIG, J. D., "Polymide Coatings", <u>Packaging, Electronic Materials Handbook</u> , Vol. 1, ASM International Handbook Committee (eds.), ASM International, Materials Park, OH,(1989),767-772	
		DE FELIPE, T. S., et al., "Electrical Stability and Microstructural Evolution in Thin Films of High Conductivity Copper Alloys", <u>Interconnect Technology</u> , 1999. IEEE International Conference, (May 24-26, 1999),293-295	
		DING, "Copper Barrier, Seed Layer and Planerization Technologies", <u>VMIC Conference Proceedings</u> , (1997),87-92	
		DUBIN, V. M., et al., "Selective and Blanket Electroless Copper Deposition for Ultralarge Scale Integration", <u>Journal of the Electrochemical Society</u> , 144(3), (1997),898-908	
		DUSHMAN, S. , et al., <u>Scientific Foundations of Vacuum Technique</u> , 2nd Edition, John Wiley and Sons,(1962),1-806	
		EDELSTEIN, D. , "Full Copper Wiring in a Sub-0.25 micrometer CMOS ULSI Technology", <u>Technical Digest.. International Electron Devices Meeting</u> , (December 7-10, 1997),773-776	
		EISENBRAUN, E. T., et al., "Selective and Blanket Low-Temperature Copper CVD for Multilevel Metallization in ULSI", <u>Conference Proceedings ULSI-VII</u> , (1992),5 pages	
		ELDRIDGE, J. M., "New Approaches for Investigating Corrosion in Thin Film Devices", <u>Electronic Packaging and Corrosion in Microelectronics, PRoceedings of ASM's Third Conference on Electric Packaging: Materials and Processes &amp; Corrosion in Microelectronics</u> , Mpls, MN,(1987),283-285	
		ERNST, et al., "Growth Model for Metal Films on Oxide Surface: Cu on ZnO(0001)-O", <u>Physical Review B</u> , 47, (May 15, 1993),13782-13796	
		FUKUDA, T. , et al., "0.5 -micrometer-Pitch Copper-Dual-Damascene Metallization Using Organic SOG (k=2.9) for 0.18-micrometer CMOS Applications", <u>Electron Devices Meeting</u> , 1999. IEDM Technical Digest. International, (1999),619-622	
		GLADLFELTER, W. L., et al., "Trimethylamine Complexes of Alane as Precursors for the Low-Pressure Chemical Vapor Deposition of Aluminum", <u>Chemistry of Materials</u> , 1, (1989),pp. 339-343	
		GODEY, D. J., et al., "Copper Diffusion in Organic Polymer Resists and Inter-level Dielectrics", <u>Thin Solid Films</u> , 308-309, (1997),pp. 470-474	

EXAMINER

DATE CONSIDERED

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		Complete if Known	
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		<b>Examiner Name</b>	Unknown
Sheet 7 of 10		Attorney Docket No: 303.673US3	

		GRIMBLOT, J. , et al., "II. Oxidation of Aluminum Films", <u>J. Electrochem.</u> , 129, (1982),pp. 2369-2372	
		HATTANGADY, S. V. , et al., "Integrated processing of silicon oxynitride films by combined plasma and rapid-thermal processing", <u>J. Vac. Sci. Technol. A</u> , 14(6), (1996),pp. 3017-3023	
		HIRAO, S. , et al., "A Novel Copper Reflow Process Using Dual Wetting Layers", <u>Symposium on VLSI Technology, Digest of Technical Papers</u> ,(1997),57-58	
		HIRAO, S. , et al., "A Novel Copper Reflow Process Using Dual Wetting Layers", <u>1997 Symposium on VLSI Technology, Digest of Technical Papers</u> ,(1997),57-58	
		HIRATA, A. , et al., "WSiN Diffusion Barrier Formed by ECR Plasma Nitridation for Copper Damascene Interconnection", <u>16th Solid State Devices and Materials</u> , (1998),pp. 260-261	
		HOLLOWAY, K. , et al., "Tantalum as a diffusion barrier between copper and silicon", <u>Applied Physics Letters</u> , 57(17), (October 1990),1736-1738	
		HU, C. K. , et al., "Extendibility of Cu Damascene to 0.1 micrometer Wide Interconnections", <u>Mat. Res. Soc. Symp.</u> , 514, (1998),pp. 287-292	
		HYMES, S. , et al., "Passivation of Copper by Silicide Formation in Dilute Silane", <u>Conference Proceedings ULSI-VII</u> , (1992),425-431	
		IIJIMA, T. , "Microstructure and Electrical Properties of Amorphous W-Si-N Barrier Layer for Cu Interconnections", <u>1996 VMIC Conference</u> , (1996),168-173	
		IZAKI, M. , et al., "Characterization of Transparent Zinc Oxide Films Prepared by Electrochemical Reaction", <u>Journal of the Electrochemical Society</u> , 144, (June 1997),1949-1952	
		JAYARAJ, K. , "Low Dielectric Constant Microcellular Foams", <u>Proceedings from the Seventh Meeting of the DuPont Symposium on Polyimides in Microelectronics</u> , (September 1996),474-501	
		JEON, Y. , et al., "Low-Temperature Fabrication of Polycrystalline Silicon Thin Films by ECR Pecvd", <u>The Electrochemical Society Proceedings</u> , 94(35), (1995),103-114	
		JIN, C. , et al., "Porous Xerogel Films as Ultra-low Permittivity Dielectrics for ULSI Interconnect Applications", <u>Conference Proceedings ULSI XII - 1997 Materials Research Society</u> , (1997),463-469	
		KALOYEROS, A. E. , et al., "Blanket and Selective Copper CVD from Cu(FOD)2 for Multilivel Metallization", <u>Mat. Res. Soc. Symp. Proc.</u> , Vol. 181,(1990),6 pages	
		KAMINS, T. I. , "Structure and Properties of LPCVD Silicon Films", <u>J. Electrochem. Soc.: Solid-State Science and Technology</u> , 127, (March 1980),pp. 686-690	
		KANG, H. K. , et al., "Grain Structure and Electromigration Properties of CVD CU Metallization", <u>Proceedings of the 10th International VLSI Multilevel Interconnection Conference</u> , (June 8-9, 1993),223-229	
		KEPPNER, H. , et al., "The "Micromorph" Cell: A New Way to High-Efficiency-Low-Temperature Crystalline Silicon Thin-Film Cell Manufacturing", <u>Mat. Res. Soc. Symp. Proc.</u> , 452, (1997),pp. 865-876	

EXAMINER

DATE CONSIDERED

<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		Complete if Known	
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		<b>Group Art Unit</b>	Unknown
		<b>Examiner Name</b>	Unknown
Sheet 8 of 10		Attorney Docket No: 303.673US3	

		KIANG, M. , et al., "Pd/Si plasma immersion ion implantation for selective electroless copper plating on Si02", <u>Applied Physics Letters</u> , 60, (1992),2767-2769	
		KIRK, RAYMOND E., <u>Kirk-Othmer Concise Encyclopedia of Chemical Technology</u> , Grayson, M., (ed.), John Wiley & Sons, Inc., New York, NY,(1985),433-435, 926-938	
		KISTIAKOWSKY, G. B., et al., "Reactions of Nitrogen Atoms. I. Oxygen and Oxides of Nitrogen", <u>The Journal of Chemical Physics</u> , 27(5), (1957),pp. 1141-1149	
		KLAUS, J W., et al., "Atomic Layer Deposition of Tungsten Nitride Films Using Sequential Surface Reactions", <u>Journal of the Electrochemical Society</u> , vol.147, no.3, (March 2000),1175-1181	
		LAURSEN, T. , "Encapsulation of Copper by Nitridation of Cu-Ti Alloy/Bilayer Structures", <u>International Conference on Metallurgical Coatings and Thin Films</u> , Abstract No. H1.03, San Diego, CA,(April 1997),309	
		LEN, V. , et al., "An investigation into the performance of diffusion barrier materials against copper diffusion using metal-oxide-semiconductor (MOS) capacitor structures", <u>Solid-State Electronics</u> , 43, (1999),pp. 1045-1049	
		LYMAN, T. , et al., "Metallography, Structures and Phase Diagrams", <u>Metals Handbook</u> , 8, American Society for Metals, Metals Park, Ohio,(1989),pgs. 300 & 302	
		MARCADAL, C. , "OMCVD Copper Process for Dual Damascene Metallization", <u>VMIC Conference, ISMIC</u> ,(1997),pp. 93-97	
		MILLER, R. D., "Low Dielectric Constant Polyimides and Polyimide Nanofoams", <u>Seventh Meeting of the DuPont Symposium on Polyimides in Microelectronics</u> , (September 1996),pp. 443-473	
		MIN, JAE-SIK , et al., "Metal-Organic Atomic-Layer Deposition of Titanium-Silicon-Nitride Films", <u>Applied Physics Letters</u> , 75(11), (1999),1521-1523	
		MIYAKE, T. , et al., "Atomic Hydrogen Enhanced Reflow of Copper", <u>Applied Physics Letters</u> , 70(10), (1997),1239-1241	
		MURARKA, S. P., et al., "Copper Interconnection Schemes: Elimination of The Need of Diffusion Barrier/Adhesion Promoter by the Use of Corrosion Resistant, Low Resistivity Doped Copper", <u>SPIE</u> , 2335, (1994),pp. 80-90	
		NAKAO, S. , et al., "Thin and Low-Resistivity Tantalum Nitride Diffusion Barrier and Giant-Grain Copper Interconnects for Advanced ULSI Metallization", <u>Japanese Journal of Applied Physics</u> , 38(4B), (April 1999),pgs. 262-263	
		NEWBOE, B. , et al., "Applied Materials Announces First Barrier/Seed Layer System For Copper Interconnects", <u>Applied Materials</u> , <a href="http://www.appliedmaterials.com/newsroom/pr-00103.html">http://www.appliedmaterials.com/newsroom/pr-00103.html</a> ,(1997),pgs. 1-4	
		OKAMOTO, Y. , et al., "Magnetically Excited Plasma Oxynitridation of Si at Room Temperature", <u>Japanese Journal of Applied Physics</u> , 34, (1995),L955-957	

EXAMINER

DATE CONSIDERED

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		<i>Complete if Known</i> <b>Application Number</b> Unknown <b>Filing Date</b> Even Date Herewith <b>First Named Inventor</b> Farrar, Paul <b>Group Art Unit</b> Unknown <b>Examiner Name</b> Unknown	
Sheet 9 of 10		Attorney Docket No: 303.673US3	

		PALLEAU, J. , et al., "Refractory Metal Encapsulation in Copper Wiring", <u>Advanced Metallization for Devices and Circuits-Science, Technology and Manufacturability, Materials Research Society Symposium Proceedings</u> , 337, (April 1994),225 - 231	
		PARK, C. W., et al., "Activation Energy for Electromigration in Cu Films", <u>Applied Physics Letters</u> , 59(2), (July 6, 1991),175-177	
		RADZIMSKI, Z. J., et al., "Directional Copper Deposition using d-c Magnetron Self-sputtering", <u>J. Vac. Sci. Technol. B</u> , 16(3), (1998),pp. 1102-1106	
		RAMOS, T , et al., "Nanoporous Silica for Dielectric Constant Less Than 2", <u>Conference Proceedings ULSI XII - 1997 Materials Research Society</u> , (1997),455-461	
		RATH, J. K., et al., "Low-Temperature deposition of polycrystalline silicon thin films by hot-wire CVD", <u>Solar Energy Materials and Solar Cells</u> , 48, (1997),pp. 269-277	
		RAY, S. K., et al., "Flourine-enhanced nitridation of silicon at low temperatures in a microwave plasma", <u>J. Appl. Phys.</u> , 70(3), (1991),pp. 1874-1876	
		ROSSNAGEL, S. M., "Magnetron Sputter Deposition of Interconnect Applications", <u>Conference Proceedings, ULSI XI</u> , (1996),227-232	
		ROSSNAGEL, S. M., et al., "Metal ion deposition from ionized mangeton sputtering discharge", <u>J. Vac. Sci. Technol. B</u> , 12(1), (1994),pp. 449-453	
		RYAN, J. G., "Copper Interconnects for Advanced Logic and DRAM", <u>Extended Abstracts of the 1998 International Conference on Solid-State Devices and Materials, Hiroshima</u> ,(1998),pp. 258-259	
		RYU, C. , et al., "Barriers for copper interconnections", <u>Solid State Technology</u> , (April 1999),pp. 53,54,56	
		SAARIVIRTA, M. J., "High Conductivity Copper Rich Cu-Zr Alloys", <u>Transactions of the Metallurgical Society of AIME</u> , 218, (1960),431-437	
		SENZAKI, Y. , "Chemical Vapor Deposition of Copper using a New Liquid Precursor with Improved Thermal Stability", <u>Conference Proceedings ULSI XIII, Materials Research Society</u> , (1998),pp. 451-455	
		SHACHAM-DIAMAND, Y. , "100 nm Wide Copper Lines Made by Selective Electroless Deposition", <u>Journal of Micromechanics and Microengineering</u> , 1, (March 1991),66-72	
		SHACHAM-DIAMAND, YOSI , et al., "Copper electroless deposition technology for ultra-large-scale-intergration (ULSI) metallization", <u>Microelectronic Engineering</u> , NL, Vol. 33, No. 1, XP004054497, (1997),47-58	
		SRIVATSA, A. R., et al., "Jet Vapor Deposition: an Alternative to Electrodeposition", <u>Surface Engineering</u> , 11, (1995),75-77	
		STROUD, P. T., et al., "Preferential deposition of silver induced by low energy gold ion implantation", <u>Thin Solid Films, Switzerland</u> , Vol. 9, No. 2, XP000993098, (Feb. 1972),273-281	
		TAO, J. , et al., "Electromigration Characteristics of Copper Interconnects", <u>IEEE Electron Devices Letters</u> , 14(5), (May 1993),249-251	

EXAMINER

DATE CONSIDERED

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> <i>(Use as many sheets as necessary)</i>		<i>Complete if Known</i> <b>Application Number</b> Unknown <b>Filing Date</b> Even Date Herewith <b>First Named Inventor</b> Farrar, Paul <b>Group Art Unit</b> Unknown <b>Examiner Name</b> Unknown	
Sheet 10 of 10		Attorney Docket No: 303.673US3	

		TING, C. H., "Methods and Needs for Low K Material Research", <u>Materials Research Society Symposium Proceedings, Volume 381, Low-Dielectric Constant Materials -- Synthesis and Applications in Microelectronics</u> , Lu, T.M., et al., (eds.), San Francisco, CA, (April 17-19, 1995), 3-17	
		TSUKADA, T. , et al., "Adhesion of copper films on ABS polymers deposited in an internal magnet magnetron sputtering system", <u>J. Vac. Sci. Technol.</u> , 16(2), (1979), 348-351	
		VAN VLACK, LAWRENCE H., "Elements of Materials Science", <u>Addison-Wesley Publishing Co., Inc. Reading, MA</u> , (1959), 468	
		VENKATESAN, S. , et al., "A High Performance 1.8V, 0.20 micrometer CMOS Technology with Copper Metalization", <u>Electron Devices Meeting, 1997. Technical Digest., International</u> , (December 7-10, 1997), 769-772	
		VOSEN, J. L., et al., <u>Thin Film Processes II</u> , Academic Press, Inc., (1991), 1-866	
		WANG, X. W., et al., "Highly Reliable Silicon Nitride Thin Films Made by Jet Vapor Deposition", <u>Japanese Journal of Applied Physics</u> , Vol. 34, Part1, No. 2B, (February 1995), 955-958	
		WANG, K. , et al., "Very Low Temperature Deposition of Polycrystalline Silicon Films with Micro-Meter-Order Grains on SiO <sub>2</sub> ", <u>Mat. Res. Soc. Symp. Proc.</u> , 355, (1995), pp. 581-586	
		WINTERS, H. F., et al., "Influence of Surface Absorption Characteristics on Reactivity Sputtered Films Grown in the Biased and Unbiased Modes", <u>J. Appl. Phys.</u> , 43(3), (1972), pp. 794-799	
		WOLF, S. , et al., <u>Silicon Processing for the VLSI Era</u> , Vol. 1 -- Process Technology, Lattice Press, Sunset Beach, CA, (1986), 514-538	
		WOLF, S. , "Chapter 4: Multilevel-Interconnect Technology for VLSI and ULSI", <u>Silicon Processing for the VLSI Era</u> , Vol. 2 Process Integration, Lattice Press, Sunset Beach, CA, (1990), 176-297	
		YEH, J. L., et al., "Selective Copper plating of Polysilicon Surface Micromachined Structures", <u>Solid-State Sensor and Actuator Workshop</u> , (1998), pp. 248-251	
		ZHANG, J. , et al., "Investigations of photo-induced decomposition of palladium acetate for electroless copper plating", <u>Thin Solid Films</u> , 318, (1998), pp. 234-238	

EXAMINER

DATE CONSIDERED